

# NHI CATALOG



## Improving the Performance of the Transportation Industry Through Training

This customized version was generated on July 8, 2012

## CATEGORY ICONS

These NHI category icons can assist users in identifying the course category or multiple course categories. The category icons are listed below for your reference.

### STRUCTURES



### GEOTECHNICAL



### CONSTRUCTION AND MAINTENANCE



### INTELLIGENT TRANSPORTATION SYSTEMS (ITS)



### REAL ESTATE



### TRANSPORTATION PLANNING



### HIGHWAY SAFETY



### SITE AND PERSONAL SAFETY



### FINANCIAL MANAGEMENT



### PAVEMENT AND MATERIALS



### DESIGN AND TRAFFIC OPERATIONS



### HYDRAULICS



### FREIGHT AND TRANSPORTATION LOGISTICS



### ENVIRONMENT



### BUSINESS, PUBLIC ADMINISTRATION & QUALITY



### COMMUNICATIONS



### ASSET MANAGEMENT



## ABOUT NHI

### WHO WE ARE

Established by the U.S. Congress in 1970, the National Highway Institute (NHI) is the training and education arm of the Federal Highway Administration (FHWA). NHI's team of talented Federal and contract employees are housed within FHWA's Office of Technical Services (OTS).

NHI helps improve the performance of the transportation industry through training. To achieve this mission, NHI provides leadership and resources to guide the development and delivery of transportation-related training in many formats including both classroom-based and distance-based learning.

### OUR PARTNERS

NHI partners with public and private organizations and educational institutions to support the training and educational needs of the transportation workforce.

### SKILLS DEVELOPMENT

NHI courses are instrumental in developing core competencies and new skills, as well as sharing leading technologies and current policies in the United States and abroad. NHI instructors strive to ensure that participants leave the training not only with additional knowledge, but also the ability to apply that knowledge directly to their work.

### OUR TRAINING

NHI offers three types of training.

**Instructor-led (ILT).** These courses are held in-person and led by an instructor. In order to open a session, an organization must request to host it. Once the session is opened, other individuals may sign up for that session (based on availability).

**Web conference (WCT).** A live, online training that takes place at a set time. Web-conference training follows the same procedure as ILTs (it must be hosted by a transportation organization). NHI hosts two monthly Web-conference series: *NHI Innovations* and *Real Solutions Seminar Series*. Both series feature guest speakers who cover a wide variety of topics for a diverse audience. *NHI Innovations* and *Real Solutions Seminar Series* are both free of charge. To learn more, see the "Free Web-Conference Training" section.

**Web based (WBT).** An online course that is available 24/7. Participants can control the pace at which they complete the course, and may return to it as many times as they wish, although the final exams can only be completed for a score once.

Certain "**blended**" courses may combine two or three of these methods (for example, a course may have a Web-based component that must be completed before the Instructor-led component).

Instructors make every effort to tailor individual sessions to meet the unique needs and array of experiences of the hosting organization, including covering local issues and topics of special interest. Drawing on their subject matter expertise, instructors can modify case studies and exercises to make them pertinent to the participant's experiences.

### ACCREDITATION

NHI is authorized to award continuing education units (CEUs) through the International Association of Continuing Education and Training (IACET).

### QUICK STATS

- NHI trains the transportation workforce through Instructor-led, Web-based, Video, and Web-conference training.
- In fiscal year 2010, NHI directly trained tens of thousands of participants.
- Our training materials are used by State DOTs, LTAP and TTAP centers, universities, local municipalities and governments, planning groups and more.

### LEARN MORE

For more information, please visit the NHI Web site at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov) or contact the NHI Training Team at [nhitraining@dot.gov](mailto:nhitraining@dot.gov). Want to be added to our mailing list? E-mail [nhimarketing@dot.gov](mailto:nhimarketing@dot.gov).

Customized Version of the NHI Catalog

Generated on July 8, 2012

Program Area: Highway Safety

Delivery Type: ILT

Sorted by Course Number

## TABLE OF CONTENTS

### INFORMATION

About NHI .....	i
Host a Course .....	1
IACET .....	3
Free Web-Conference Training .....	4
NHI Certificates of Accomplishment .....	5

### HIGHWAY SAFETY

FHWA-NHI-380005 Railroad-Highway Grade Crossing Improvement Program .....	6
FHWA-NHI-380032A Roadside Safety Design (3-Day) .....	7
FHWA-NHI-380034 Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (1-Day) .....	8
FHWA-NHI-380034A Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (2-Day) .....	9
FHWA-NHI-380034B Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (3-Day) .....	10
FHWA-NHI-380069 Road Safety Audits/Assessments .....	11
FHWA-NHI-380070 Highway Safety Manual Practitioners Guide for Geometric Design Features .....	12
FHWA-NHI-380070A Highway Safety Manual Practitioners Guide for Two-Lane Rural Highways .....	13
FHWA-NHI-380070B Highway Safety Manual Practitioners Guide for Multilane Highways .....	14
FHWA-NHI-380071 Interactive Highway Safety Design Model .....	15
FHWA-NHI-380073 Fundamentals of Planning, Design and Approval of Interchange Improvements to the Interstate System ..	16
FHWA-NHI-380074 Designing and Operating Intersections for Safety .....	17
FHWA-NHI-380075 New Approaches to Highway Safety Analysis .....	18
FHWA-NHI-380076 Low-Cost Safety Improvements Workshop .....	19
FHWA-NHI-380077 Intersection Safety Workshop .....	20
FHWA-NHI-380078 Signalized Intersection Guidebook Workshop .....	21
FHWA-NHI-380085 Guardrail Installation Training .....	22
FHWA-NHI-380088 Highway Safety Manual Practitioners Guide for Horizontal Curves .....	23
FHWA-NHI-380089 Designing for Pedestrian Safety .....	24
FHWA-NHI-380090 Developing a Pedestrian Safety Action Plan .....	25
FHWA-NHI-380091 Planning and Designing for Pedestrian Safety .....	26
FHWA-NHI-380095 Geometric Design: Applying Flexibility and Risk Management .....	27
FHWA-NHI-380096 Modern Roundabouts: Intersections Designed for Safety .....	28
FHWA-NHI-380097 An Overview of the Railroad-Highway Grade Crossing Improvement Program .....	29
FHWA-NHI-380103 Highway Safety Improvement Program Manual .....	30
FHWA-NHI-380105 Highway Safety Manual Practitioners Guide for Intersections .....	31
FHWA-NHI-380109 Alternative Intersections and Interchanges .....	32
NHI Store .....	33
Contacts .....	45

## HOST A COURSE

### NHI PARTNERS WITH HOSTS TO DELIVER TRAINING

NHI has a unique business model, which allows NHI to partner with the transportation industry to develop and deliver training. When we deliver training throughout the country and abroad, the hosting organizations provide facilities and equipment, and NHI provides top notch instructors and course materials.

Because of this unique delivery model, “Hosts” or Local Coordinators play a significant role in coordinating NHI training. In this section of the catalog, we will review how to host sessions of NHI training. For new hosts, we also provide an orientation at [www.nhi.fhwa.dot.gov/training/HostCourse.aspx](http://www.nhi.fhwa.dot.gov/training/HostCourse.aspx).

### REQUESTS

Any organization can host an NHI session – be it FHWA Divisions, State departments of transportation (DOTs), consultants, metropolitan planning organizations (MPOs), professional associations, universities, or others.

To host NHI sessions, the online Host Request form is submitted through the NHI Web site for domestic customers. You can find the Host Request form at [www.nhi.fhwa.dot.gov/training/HostCourse.aspx](http://www.nhi.fhwa.dot.gov/training/HostCourse.aspx).

### DOMESTIC CUSTOMERS

NHI courses are designed for transportation personnel working in both the public and private sectors of the transportation industry. You can host Instructor-led trainings (ILT), which are taught in classrooms, and/or Web-conference trainings (WCT), which are taught via the Internet. To host a course, fill out the appropriate Host Request form (ILT or WCT).

#### Login to NHI Web Site

NHI has automated its Host Request form process. You can go online to complete a Host Request form in just a few minutes. First time users will need to create a user profile and check the **INSTRUCTOR/HOST BOX**.

If you run into any difficulty when you are logging in, filling out a Host Request form, or navigating the NHI Web site, please contact NHI Customer Support for help by telephone at (703) 235-0534. Your question will be answered as soon as possible during normal business hours. If no one is able to assist you at the time of your call, you may also email the Webmaster at [nhiwebmaster@dot.gov](mailto:nhiwebmaster@dot.gov).

#### Confirm Session Dates/Locations/Times

After the Host Request form is received, an Instructor or a member of the NHI team will contact the Local Coordinator to discuss scheduling. After NHI confirms the session, the host will receive confirmation, the local FHWA Training Coordinator will be notified, and the session will be listed on the NHI Web site. While preferred dates may be specified on the Host Request form, sessions are not official until the hosting organization receives formal confirmation from NHI.

#### Enrollment Options to Make Your Work Easier!

The Local Coordinator contact information will always be listed with the scheduled session. The Local Coordinator can be contacted to enroll participants directly. Hosts are also able to sell session seats through the NHI Web site. We call these “public seats.”

When hosts elect this option, the display for a scheduled session will have a shopping cart appear with the listing. Individuals can enroll by adding the session to their shopping cart and proceeding to checkout. The NHI Scheduler will e-mail enrolled participant information to the Local Coordinator and instructor prior to the start date to let them know who will be attending their session.

#### NHI Course Materials

Course material will be shipped three weeks prior to the session start date. To assist the host in preparation and coordination for the session, a Host/Local Coordinator Checklist is provided on the NHI Web site and has a suggested step-by-step process for those who are setting up the training site.

#### Provide Payment and Feedback

Payment may be made to NHI by check, money order, or credit card. Checks and money orders must be made payable to the National Highway Institute. To make credit card payments, contact the NHI Training Team at [nhitraining@dot.gov](mailto:nhitraining@dot.gov) or (703) 235-0534. You are not charged for any FHWA participants or participants who paid via the NHI Web site.

We understand how busy you are, but we would appreciate your feedback. Please remember to fill out the Host Evaluation form you receive with your training materials. You can also use the **CONTACT US** link on any NHI Web site page to send us any questions, comments, or concerns.



## INTERNATIONAL CUSTOMERS

### Host NHI Courses

We provide assistance to international organizations wishing to purchase standard NHI training courses on a variety of technical subjects. These courses can be tailored to your organization's specific needs at an additional cost. For more information about training for international participants, please contact Roger Dean at (703) 235-0550 or by e-mail at [roger.dean@fhwa.dot.gov](mailto:roger.dean@fhwa.dot.gov).

### Provide Payment

NHI will fax an invoice to the individual or organization upon completion of the session. Cashier's checks, international money orders, and credit cards are accepted forms of payment. Special arrangements will have to be made for wire transfers, and customers must ensure that they pay all related bank fees. All cashier's checks and international money orders must be payable in U.S. dollars to the National Highway Institute.

## HOST/LOCAL COORDINATOR CHECKLIST

Everyone has attended training sessions where the Instructor could not find the markers or the flip chart paper; the room was too hot or too cold; or there was not enough room for the number of participants scheduled for the session. Based upon the 40 years of experience with our host partners, NHI has developed some good practice tips on hosting an NHI course. The Host/Local Coordinator checklist is available on the NHI Web site at <http://www.nhi.fhwa.dot.gov/training/HostCourse.aspx>.

## FEES

Course fees, which include the cost of materials for each participant, are listed with every course description. Typically, a minimum number of 20 paid participants are required to hold a session. However, course fees and minimums may vary. Hosts are not charged for FHWA personnel or participants who have paid via the NHI Web site. Hosts are not charged for any instructor expenses. NHI will continue to recover the full cost of delivery for international presentations. These will be handled on a case-by-case basis.

Checks, money orders, or other generally accepted forms of payment from individual session participants will be accepted as part of the NHI course session fee, and must be made payable to the National Highway Institute. Such payments are forwarded to NHI as soon as they are received with the amount of the invoice reduced accordingly; or they can be submitted as part of the total payment upon invoice to the hosting organization.

## SURCHARGES

Course hosts may charge participants an additional fee to recover all or part of costs associated with hosting the course. However, we ask hosts to contact the NHI Scheduler at (703) 235-0534 with this information prior to the confirmation of the session. Hosts must also inform participants of the surcharge. Participants covered by the final host payment must register with the host, and not online. Hosts will not receive a refund from NHI to cover associated expenses incurred in hosting the session. The surplus amount is credited to the Host's final invoice. FHWA employees attending the session are not required to pay any additional fees.

## CANCELLATION POLICY/REFUNDS

The host of an NHI course must contact the NHI Training Director at (703) 235-0520 for approval to cancel a session for any reason. To avoid incurring any fees, we request cancellation no later than 10 working days prior to the session start date. If the course materials have been sent, the host must contact the NHI Materials Manager at (703) 235-0552. In the event of cancellation for any reason, it is the hosts' responsibility to contact all participants. There must be validation that the registrants received cancellation notice. Notice to out-of-State participants is especially important to avoid charges for travel. If notification of cancellation occurs in less than 10 days prior to the start date of the session, travel costs for the participants and Instructors may be the responsibility of the host.

Your refund will be processed as quickly as possible. Credit card reimbursements should appear within two billing cycles. A credit to host another NHI course will be issued if payment was made by check. For questions about your refund, please contact the NHI Training Team at (703) 235-0534 or [nhitraining@dot.gov](mailto:nhitraining@dot.gov). For the most up-to-date information on NHI policies, please refer to the NHI Web site.

## AUDIENCE

When assessing internal training needs, we encourage hosts of NHI course sessions to survey the training needs of entities outside their own organization. In some cases, the combined needs may warrant hosting a course for which there otherwise would not be sufficient interest. By attending training together, all parties receive the same training, benefit from the breadth of experience added to classroom discussions, and increase their understanding of each other's perspectives by working together on class exercises.

## INTERNATIONAL ASSOCIATION FOR CONTINUING EDUCATION AND TRAINING

The National Highway Institute (NHI) has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102.

IACET is an independent, non-profit association whose goal is to ensure quality continuing education for professionals. For an organization to become an IACET approved CEU authorized provider, it must demonstrate that it designs, develops, and delivers training in accordance with proven adult learning theory and recognizes instructional systems design practices. Each course description in the NHI Catalog includes the number of CEUs awarded upon successful completion of the course.

There is a trend by States to require annual professional education for professional employees coupled with the need to make every dollar committed to training count. Recognition by IACET assures both the employee and the employer that taking a NHI course is a valuable use of time and scarce training dollars.

One CEU is awarded for every ten contact hours of training led by a qualified instructor and qualified instruction. Lunch periods and breaks are not calculated when determining the number of contact hours. Thus, in an eight hour day, there are six contact hours of instruction for an award of 0.6 CEU per day. In addition, NHI is approved to award CEUs for its distance learning training. The training may take the form of Web-based training, Web-based conferencing, video conferencing, self-paced or any combination of the various methods.

On occasion, there may be adjustments to the course length to accommodate course hosting location conditions. In that event, the number of CEUs awarded will be adjusted to reflect the actual contact hours.

NHI will maintain individual training records for seven years for the CEUs awarded for successful completion of eligible courses effective January 1, 2004. Individuals and their employers are also encouraged to maintain their own training records including course name, class dates, instructor name, class roster and CEUs awarded.



## FREE WEB-CONFERENCE TRAINING

NHI is excited to offer FREE Web-conference training. These trainings save both time and money, while covering the latest topics and techniques within the transportation industry. This training comes in the form of two monthly Web-conference series: *NHI Innovations* and *Real Solutions Seminar Series*. All transportation professionals in the public and private sectors are invited to participate. Both series allow participants to ask questions and receive answers from the guest speakers.

### NHI INNOVATIONS

NHI partners with Highways for LIFE, an FHWA program working to accelerate the adoption of new technologies, to present *NHI Innovations*. Each month, a panel of experts leads participants in a discussion of innovations in the transportation industry and describes key factors in successful implementation of those innovations.

Some past topics include:

- Best Practices in Accelerated Construction Techniques
- Pavement Smoothness
- Road Safety Audits
- Speed Management in Work Zones

Visit the *NHI Innovations* section of the Web site to register for the next *NHI Innovations* Web conference or to listen to past Web conferences.

### REAL SOLUTIONS SEMINAR SERIES

This series of free monthly Webinars features a guest speaker who presents problems or issues faced in the field and what steps were taken to solve them. In some sessions, additional panelists join the guest speaker to further discuss that seminar's topic.

Some past topics include:

- Best Practices for Integrating Climate Change Considerations in the Transportation Planning Process
- eLearning and Distance Learning within the Transportation Industry
- Smart Corridors and Complete Streets: A Look at Some Situations and Strategies
- Solving Old Traffic Noise Ills: Tennessee Type II Noise Abatement Program

Visit the *Real Solutions Seminar Series* section of the Web site to register for the next *Real Solutions* Web conference or to listen to past Web conferences.

### LEARN MORE

For more information, please visit the NHI Web site at **[www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov)**.

Want to be notified when a free Web conference is scheduled? Email [nhimarketing@dot.gov](mailto:nhimarketing@dot.gov).



## NHI CERTIFICATES OF ACCOMPLISHMENT

The National Highway Institute (NHI) offers the Certificate of Accomplishment program, which was designed to recognize individuals who have successfully completed and achieved passing grades in selected groupings of related NHI course offerings. The certificate program features suites of complementary NHI courses bundled together to enable participants to enhance their depth and breadth of knowledge and expertise in specific disciplines or topic areas.

Certificates of Accomplishment are available in the following disciplines, with more to come over the next year.

### WORK ZONE SAFETY

Certificate of Accomplishment in Work Zone Safety features the following NHI courses:

- 380003—Design and Operation of Work Zone Traffic Control
- 380060—Work Zone Traffic Control for Maintenance Operations
- 380063—Construction Zone Safety Inspection
- 380072—Advanced Work Zone Management and Design

### RELOCATION UNDER THE UNIFORM ACT

Certificate of Accomplishment in Relocation under the Uniform Act features the following NHI courses:

- 141029—Basic Relocation under the Uniform Act
- 141030—Advanced Relocation under the Uniform Act
- 141031—Business Relocation under the Uniform Act

### INCIDENT MANAGEMENT

Certificate of Accomplishment in Incident Management features the following NHI courses:

- 133048A—Managing Traffic Incident and Roadway Emergencies (2 day)
- 133099—Managing Travel for Planned Special Events (2 day)
- 133101—Using the Incident Command System (ICS) at Highway Incidents (2 day)

### FREIGHT MANAGEMENT AND OPERATIONS

Certificate of Accomplishment in Freight Management and Operations features the following NHI courses:

- 139003—Advanced Freight Planning
- 139005—Linking Freight to Planning and the Environment
- 139006/139006A—Integrating Freight in the Transportation Planning Process/Integrating Freight in the Transportation Planning Process WBT 508 Version\*

\*Participants must successfully complete 139006 Integrating Freight in the Transportation Planning Process prior to attending 139003. Participants **MUST** bring a copy of their certificate of completion to their scheduled session of 139003 and provide it to the lead instructor.

Any course sessions successfully completed and passed within the chosen NHI course suite since January 1, 2004, are eligible for inclusion in the Certificate of Accomplishment program. Sessions attended prior to that date are not eligible. No waivers or substitutions will be accepted.

All the courses in the suite must be completed within 4 years of taking the first course. To be eligible to receive a Certificate of Accomplishment, participants must successfully complete each course in the suite. Successful completion includes attendance of the full session and scoring at least 70% on the final assessment.

For more information about the Certificates of Accomplishment, please visit the NHI Web site at [www.nhi.fhwa.dot.gov/training/cert\\_programs.aspx](http://www.nhi.fhwa.dot.gov/training/cert_programs.aspx).

**COURSE NUMBER**

FHWA-NHI-380005

**COURSE TITLE****Railroad-Highway Grade Crossing Improvement Program**

The training provides information on rail-highway crossings, grade crossing components, including program/project development and administration. Workshops will provide the participants a chance to make hands-on applications of the training material, which include such topics as historical background, railroad-highway intersection definition and components, collection and maintenance of data, assessment of crossing safety and operations, identification and selection of alternate improvements, program and project development and implementation, maintenance, and other topics (i.e., private crossings, operation lifesaver).

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Describe Active and Passive Devices used in connection with at-grade crossings
- Identify techniques and engineering principles used for at-grade crossings
- Appraise existing at-grade crossings
- Develop alternate methods to improve railroad-highway grade crossings

**TARGET AUDIENCE**

Federal, State, and local transportation agencies responsible for the design, construction, and/or maintenance of railroad-highway crossings. State and local traffic engineers responsible for highway-railroad grade crossing safety.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Guan Xu • (202) 366-5892 • [guan.xu@fhwa.dot.gov](mailto:guan.xu@fhwa.dot.gov)

**Subject Matter Expert:** John McFadden • 410-962-2482 • [john.mcfadden@dot.gov](mailto:john.mcfadden@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380032A

## COURSE TITLE

### Roadside Safety Design (3-Day)

This course provides an overview of the AASHTO Roadside Design Guide. At the end of the course, you will be able to apply the clear zone concept to all classes of roadways; recognize unsafe roadside design features and elements and make appropriate changes; identify the need for a traffic barrier; and apply other highway hardware core competencies.

This course is intended for experienced safety and design engineers.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Apply the clear zone concept to all classes of roadway
- Warrant roadside and median barriers
- Design roadside barriers
- Select the most appropriate end treatment
- Select the most appropriate safety hardware
- Correctly locate safety hardware
- Describe the elements of economic analysis

## TARGET AUDIENCE

Experienced Federal, State, and local highway engineers involved in the formulation and/or application of policies and standards relating to the design of safe roadside hardware.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$550 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Dick Albin • (360) 534-9312 • [dick.albin@dot.gov](mailto:dick.albin@dot.gov)

**Subject Matter Expert:** Frank Julian • (404) 562-3689 • [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380034

**COURSE TITLE****Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (1-Day)**

The course has been developed for a 3-day course presentation but can also be structured into a 1- or 2-day training course. The sponsoring agency will be able to choose the modules for presentation that will best meet its needs. The course covers the design, construction, and maintenance of highway safety appurtenances and features. It covers the purpose and performance requirements of state-of-the-art highway safety features, such as breakaway sign supports, breakaway utility poles, traffic barriers, impact attenuators, traversable terrain, and hardware features such as drainage inlets. The course describes how these features function, what can go wrong, and how to recognize and correct improper installations.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Identify advantages and disadvantages of different types of longitudinal barriers and crash cushions
- Identify National Cooperative Highway Research Program 350 tested safety appurtenances
- Identify application of highway safety appurtenances, why they are used, when and where they should be used, and what is necessary to ensure their function
- Design the placement of, and determine the need for, longitudinal barriers
- Use required installation, construction, and maintenance procedures for proprietary longitudinal barriers, terminals, transitions, crash cushions, bridge railings, and sign supports
- Recognize substandard or potentially hazardous highway appurtenances and features
- Develop alternatives to eliminate, correct, or mitigate unsatisfactory operational characteristics of existing safety devices

**TARGET AUDIENCE**

Highway engineers, including local personnel involved in the design, construction, or maintenance of highway safety appurtenances and features. This course is suitable for all local, State, and Federal employees that are involved with the installation and repair of highway appurtenances.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Frank Julian • (404) 562-3689 • [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380034A

## COURSE TITLE

### Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (2-Day)

The course has been developed for a 3-day course presentation but can also be structured into a 1- or 2-day training course. The sponsoring agency will be able to choose the modules for presentation that will best meet its needs. The course covers the design, construction, and maintenance of highway safety appurtenances and features. It covers the purpose and performance requirements of state-of-the-art highway safety features, such as breakaway sign supports, breakaway utility poles, traffic barriers, impact attenuators, traversable terrain, and hardware features such as drainage inlets. The course describes how these features function, what can go wrong, and how to recognize and correct improper installations.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Identify advantages and disadvantages of different types of longitudinal barriers and crash cushions
- Identify National Cooperative Highway Research Program 350 tested safety appurtenances
- Identify application of highway safety appurtenances, why they are used, when and where they should be used, and what is necessary to ensure their function
- Design the placement of, and determine the need for, longitudinal barriers
- Use required installation, construction, and maintenance procedures for proprietary longitudinal barriers, terminals, transitions, crash cushions, bridge railings, and sign supports
- Recognize substandard or potentially hazardous highway appurtenances and features
- Develop alternatives to eliminate, correct, or mitigate unsatisfactory operational characteristics of existing safety devices

## TARGET AUDIENCE

Highway engineers, including local personnel involved in the design, construction, or maintenance of highway safety appurtenances and features. This course is suitable for all local, State, and Federal employees that are involved with the installation and repair of highway appurtenances.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Frank Julian • (404) 562-3689 • [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



**COURSE NUMBER**

FHWA-NHI-380034B

**COURSE TITLE****Design, Construction, and Maintenance of Highway Safety Appurtenances and Features (3-Day)**

The course has been developed for a 3-day course presentation but can also be structured into a 1- or 2-day training course. The sponsoring agency will be able to choose the modules for presentation that will best meet its needs. The course covers the design, construction, and maintenance of highway safety appurtenances and features. It covers the purpose and performance requirements of state-of-the-art highway safety features, such as breakaway sign supports, breakaway utility poles, traffic barriers, impact attenuators, traversable terrain, and hardware features such as drainage inlets. The course describes how these features function, what can go wrong, and how to recognize and correct improper installations.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Identify advantages and disadvantages of different types of longitudinal barriers and crash cushions
- Identify National Cooperative Highway Research Program 350 tested safety appurtenances
- Identify application of highway safety appurtenances, why they are used, when and where they should be used, and what is necessary to ensure their function
- Design the placement of, and determine the need for, longitudinal barriers
- Use required installation, construction, and maintenance procedures for proprietary longitudinal barriers, terminals, transitions, crash cushions, bridge railings, and sign supports
- Recognize substandard or potentially hazardous highway appurtenances and features
- Develop alternatives to eliminate, correct, or mitigate unsatisfactory operational characteristics of existing safety devices

**TARGET AUDIENCE**

Highway engineers, including local personnel involved in the design, construction, or maintenance of highway safety appurtenances and features. This course is suitable for all local, State, and Federal employees that are involved with the installation and repair of highway appurtenances.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$500 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Frank Julian • (404) 562-3689 • [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380069

## COURSE TITLE

### Road Safety Audits/Assessments

Performing effective road safety audits/assessments, (RSAs), improves safety and demonstrates to the public an agency's dedication to crash reduction. An RSA is a formal safety performance examination of an existing or future road or intersection by an independent audit team. The RSA training provides practical information on how to conduct an RSA, select a location, and build an independent, multi-disciplinary team. The costs, time, benefits, and common myths and concerns surrounding RSAs will be discussed. Participants learn how to improve transportation safety by applying a new proactive approach. Emphasis is placed on using low cost safety improvements as well as understanding the interaction between the highway and all road users.

The training includes hands-on application of the training materials, which includes information on each stage of a road safety audit and easy-to-use-prompt lists. A copy of "FHWA Road Safety Audit Guidelines" is provided.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Express the road safety audit process terminology
- Perform a simple road safety audit, as a member of a team
- Assess the benefits of a road safety audit on a local or statewide basis

## TARGET AUDIENCE

Personnel who are likely to serve on a road safety audit team including Federal, State, local transportation personnel, first responders and consultants who conduct highway safety studies should also attend.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Craig Allred • (720) 963-3236 • [craig.allred@dot.gov](mailto:craig.allred@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380070

**COURSE TITLE****Highway Safety Manual Practitioners Guide for Geometric Design Features**

This course includes both 2-lane and multi-lane highways and provides a proven methodology for the safety performance of geometric design decisions in a like manner to that of predicting capacity and level of service based upon large scale definitive research. The crash prediction models for total crashes and cross-section related crashes based upon lane width, shoulder width, roadside hazard, traffic volume (exposure) and other characteristics are presented. Examples of safety performance prediction are presented for highway segments and intersections.

Discussion of research and the interactive effects of lane and shoulder widths, hazard rating, and access density (driveways) on safety performance are presented. Each student receives a copy of the "Safety Effects of Highway Design Features" manual.

**IMPORTANT:** Participants should bring a scientific notation calculator as the course involves calculating decimal value to decimal power for crash prediction values.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Recognize the safety effects of geometric design features
- Predict the safety performance of geometric design features
- Compare alternative designs based upon an assessment of the safety effects of geometric design features

**TARGET AUDIENCE**

State and local highway engineers and consultants involved in the design of both two-lane rural and/or multilane highways.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Gene Amparano • (816) 329-3909 • [gene.amparano@fhwa.dot.gov](mailto:gene.amparano@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380070A

## COURSE TITLE

### Highway Safety Manual Practitioners Guide for Two-Lane Rural Highways

This course provides a proven methodology for the safety performance of geometric design decisions in a like manner to that of predicting capacity and level of service based upon large scale definitive research. The crash prediction models for total crashes and cross-section related crashes based upon lane width, shoulder width, roadside hazard, traffic volume (exposure) and other characteristics are presented. Examples of safety performance prediction are presented for highway segments and intersections.

Discussion of research and the interactive effects of lane and shoulder widths, hazard rating, and access density (driveways) on safety performance are presented. Each student receives a copy of the "Safety Effects of Highway Design Features for Two-Lane Rural Highways" manual.

**IMPORTANT:** Participants should bring a scientific notation calculator as the course involves calculating decimal value to decimal power for crash prediction values.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Recognize the safety effects of geometric design features
- Predict the safety performance of geometric design features
- Compare alternative designs based upon an assessment of the safety effects of geometric design features

## TARGET AUDIENCE

State and local highway engineers and consultants involved in the design of two-lane rural highways.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Gene Amparano • (816) 329-3909 • [gene.amparano@fhwa.dot.gov](mailto:gene.amparano@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380070B

**COURSE TITLE****Highway Safety Manual Practitioners Guide for Multilane Highways**

This course provides proven methodology for the safety performance of geometric design decisions for multilane highways in a like manner to that of predicting capacity and level of service based upon large scale definitive research. The crash prediction models for total crashes based upon lane width, shoulder width, roadside hazard, traffic volume (exposure) and other characteristics are presented. Examples of safety performance prediction are presented for highway segments and intersections.

Discussion of research and the interactive effects on safety performance for median width and barriers, of access (driveways) and side streets and intersection turning lanes are presented. Each student receives a copy of the "Safety Effects of Highway Design Features" manual.

**IMPORTANT:** Participants should bring a scientific notation calculator as the course involves calculating decimal value to decimal power for crash prediction values.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Recognize the safety effects of geometric design features
- Predict the safety performance of geometric design features
- Compare alternative designs based upon an assessment of the safety effects of geometric design features

**TARGET AUDIENCE**

State and local highway engineers and consultants involved in the design of multilane highways.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Course; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Gene Amparano • (816) 329-3909 • [gene.amparano@fhwa.dot.gov](mailto:gene.amparano@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)





## COURSE NUMBER

FHWA-NHI-380071

## COURSE TITLE

### Interactive Highway Safety Design Model

This course instructs highway design project managers, planners, designers, and traffic and safety reviewers in the application of the Interactive Highway Safety Design Model (IHSDM) software and provides guidance on interpretation of the output.

IHSDM is a suite of software tools to evaluate safety of two-lane rural highways. The software, developed for FHWA, was released in 2003 after several years of research and development to provide state-of-the-art techniques for safety analysis. IHSDM contains five tools that can be used to apply the most recent safety analysis techniques in a relatively straightforward and automated manner. For more information about IHSDM, go to <http://www.tfhr.gov/safety/ihsdm/ihsdm.htm>.

Participants gain hands-on experience with the software. Therefore, the training facility must be equipped with computers. There should be no more than two participants per computer. Minimum system specifications for the computers are as follows: Operating System - Microsoft Vista, Windows XP or Windows 2000 Professional; HTML Browser - Microsoft Internet Explorer, Netscape Navigator, or Firefox; Spreadsheet Program, Microsoft Excel or equivalent; Hardware - At least 450 MHz Pentium III (or equivalent) CPU, 256 MB RAM or greater desirable, 800x600 high colors (16 bit) display; and 300 MB free disk space

## OUTCOMES

Upon completion of the course, participants will be able to:

- Describe key capabilities and limitations of IHSDM
- Evaluate a two-lane rural highway using IHSDM
- Recognize when and how IHSDM can be used in the project development process

## TARGET AUDIENCE

Highway design project managers, planners, designers, and traffic and safety reviewers with at least one or two years of experience with highway design, preferably two-lane rural highway design.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Clayton Chen • (202) 493-3054 • [clayton.chen@fhwa.dot.gov](mailto:clayton.chen@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380073

**COURSE TITLE****Fundamentals of Planning, Design and Approval of Interchange Improvements to the Interstate System**

This course provides participants with key knowledge of freeway systems and interchange types, FHWA policy on justification for interchange access approval, and applications of technical knowledge and policy understanding to interchange project decisions. Topics covered in this course include service and system interchange types, 8-point interchange justification process, interchange study and selection process, fundamentals of freeway system operations and planning, urban freeway diagnosis, geometric design considerations, and technical and documentation procedures.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Compare and contrast design and operational attributes of different of freeway interchange types
- Interpret and apply the elements of the FHWA Policy for approving Interstate access
- Describe and apply principles of good freeway systems and interchange design
- Describe the application of design exceptions to interchange project decisions
- Describe the content of an appropriate safety and operational analysis to support an access request
- Compare alternative designs based upon an assessment of appropriate measures of effectiveness (MOEs)
- Apply an interchange design study procedure

**TARGET AUDIENCE**

The target audience for the course includes traffic engineers and transportation professionals with one to five years of working experience.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$500 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Mark Doctor • (404) 562-3732 • [mark.doctor@fhwa.dot.gov](mailto:mark.doctor@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380074

## COURSE TITLE

### Designing and Operating Intersections for Safety

Through numerous interactive discussions, exercises, and case studies, this course examines various aspects of design and operations and how they affect the safety of an intersection and its various users. The full course contains a total of six modules: Users and Intersections, Diagnostics and Countermeasures, Geometric Design, Unsignalized Intersections, Signalized Intersections, and Case Studies.

## OUTCOMES

Upon completion of the course, participants will be able to:

- List the user groups to consider
- Describe user characteristics and how they affect intersection design and safety
- Describe approaches to balance needs of different user groups
- Review how to determine which intersections have poor crash experience
- Review how to assess causes of high crash experience or high potential
- Describe how to select appropriate countermeasures
- Define intersection design objectives, controls, and focus area
- Identify key safety-related intersection geometric design decisions, applications, and assumptions
- Describe the measured and potential safety improvements that result from key intersection geometrics
- Describe safety issues at unsignalized intersections
- Summarize MUTCD requirements for signaling an intersection
- Select appropriate countermeasures to address safety issues at unsignalized intersections
- Identify common safety concerns at signalized intersections
- Discuss contributing factors to safety concerns
- Select countermeasures to the safety of signalized intersections

## TARGET AUDIENCE

The target audience for the course includes traffic and design engineers with one to five years of work experience.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$500 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Timothy Taylor • (404) 562-3560 • [timothy.taylor@dot.gov](mailto:timothy.taylor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380075

**COURSE TITLE****New Approaches to Highway Safety Analysis**

The primary purpose of this course is to help attendees gain an understanding of the Highway Safety Improvement Program (HSIP) process, safety engineering principles and human factors issues related to traffic and road safety. It also provides the participant with an explanation of the latest methods for identifying collision causes and selecting cost-effective safety improvements. Finally, this course will serve as a prerequisite for those who will be utilizing SafetyAnalyst, a set of software tools currently under development that are designed to assist State and local agencies to improve the decisionmaking process in implementing safety improvement projects.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Describe the components of the Highway Safety Improvement Program (HSIP)
- Explain safety engineering principles relevant to planning for highway safety improvement measures specific to three types of crashes : roadway departures, intersection-related, and pedestrian
- Describe the relevance and impact of human factors in the planning of highway safety improvement measures for three types of crashes : roadway departures, intersection-related, and pedestrian
- Determine strategies for the selection of cost-effective highway safety improvement measures for three types of crashes : roadway departures, intersection-related, and pedestrian

**TARGET AUDIENCE**

This course is intended primarily for State DOT staff involved with the Highway Safety Improvement Program, and for FHWA safety specialists. These specialists include engineers, planners, and technicians.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$500 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Karen Yunk • (609) 637-4207 • [karen.yunk@dot.gov](mailto:karen.yunk@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380076

## COURSE TITLE

### Low-Cost Safety Improvements Workshop

This course provides a comprehensive presentation of low-cost, ready-to-use improvements that enhance the safety of highways. The course covers a synthesis of countermeasures and their associated crash reduction factors as identified in the "AASHTO Strategic Highway Safety Plan -- NCHRP 500 Guidebooks." Countermeasures for specific areas of highway safety, including roadside hazards; signing, markings, and lighting; traffic control devices; intersections; traffic signals; and railroad grade crossings are discussed. The course also introduces recent low-cost safety improvements that have been developed by States and local engineers. Through exercises, participants learn how to analyze highway safety situations and apply appropriate countermeasures to those situations.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Identify appropriate engineering countermeasures from crash patterns
- Recognize deficiencies in operation/design and select appropriate countermeasures for roadside hazards
- Recognize deficiencies in safety performance of signing, markings, and lighting, and elect appropriate countermeasures
- Recognize deficiencies in operation/design of intersections and select appropriate countermeasures
- Recognize deficiencies in operation/design of traffic signals and select appropriate countermeasures
- Recognize deficiencies in operation/design of railroad grade crossings and select appropriate countermeasures
- Illustrate new and innovative low-cost safety improvement measures developed by State DOTs

## TARGET AUDIENCE

Federal, State, and local transportation, traffic and safety engineers, and planners involved in reducing crashes.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 35

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** John McFadden • (410) 962-2482 • [john.mcfadden@fhwa.dot.gov](mailto:john.mcfadden@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



**COURSE NUMBER**

FHWA-NHI-380077

**COURSE TITLE****Intersection Safety Workshop**

Beginning with an introduction to intersection and crash characteristics, this course provides information on ready-to-use, direct-application safety measures for rural unsignalized and signalized intersections. Participants are presented with a synthesis of countermeasures and their associated crash reduction factors as identified in the "AASHTO Strategic Highway Safety Plan - NCHRP 500 Guidebooks." The course focuses on the application of these countermeasures and design and safety operations best practices for substantive improvements to intersection safety. During the course, participants have the opportunity to present intersection safety situations that they are currently facing and discuss appropriate countermeasures and best practices to address those situations.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Apply models (equations) to predict the number of crashes for an intersection based upon traffic volumes
- Identify high crash intersections and recognize appropriate engineering countermeasures
- Identify crash reduction factors/crash modification factors associated with countermeasures
- Describe safety performance of intersection geometric design features and the models to quantify the safety effect
- List regulatory, warning, and guide signing and markings countermeasures and associated safety benefits
- List highway lighting countermeasures and associated safety benefits
- List traffic signal countermeasures and associated safety benefits

**TARGET AUDIENCE**

Federal, State, and local transportation traffic and safety engineers, and planners involved in reducing intersection crashes.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Timothy Taylor • (404) 562-3560 • [timothy.taylor@dot.gov](mailto:timothy.taylor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380078

## COURSE TITLE

### Signalized Intersection Guidebook Workshop

This course provides an overview of the "Signalized Intersections: Informational Guide FHWA-HRT-04-091." The guide is a comprehensive document containing methods for evaluating the safety and operations of signalized intersections and tools to remedy deficiencies. It takes a holistic approach to signalized intersections and considers the safety and operational implications of a particular treatment on all system users, including motorists, pedestrians, bicyclists, and transit users. Using the guide, participants learn to make insightful intersection assessments, understand the tradeoffs of potential improvement measures, and apply guidebook measures and best practices to reduce the incidence of intersection crashes.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Recognize and apply fundamentals of signalized intersections in terms of user needs, geometric design, traffic design, and illumination
- Describe signalized intersection project process, safety analysis methods, and operational analysis methods
- Describe the more than 100 signalized intersection treatments and their advantages and disadvantages

## TARGET AUDIENCE

Federal, State, and local transportation, traffic and safety engineers, and planners involved in planning, designing, operating, and remedying crash problems for signalized intersections.

**TRAINING LEVEL:** Intermediate

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Timothy Taylor • (404) 562-3560 • [timothy.taylor@dot.gov](mailto:timothy.taylor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380085

**COURSE TITLE****Guardrail Installation Training**

This course provides instruction in the principles and practices of guardrail installation and performance. Instruction focuses on the Length of Need of barriers (including a field expedient procedure) but also includes instruction on guardrail transitions and guardrail end treatments. Participants will evaluate existing installations for proper performance characteristics.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Explain the “Roadside Safety” problem and the warrants for barrier.
- Explain how barrier systems operate.
- Describe the installation principles necessary for proper barrier operation.
- Describe the installation principles necessary for proper terminal operation.
- Inspect barrier systems for proper installation and operation.

**TARGET AUDIENCE**

Due to the amount of material in this one day course, the pace is best suited for the experienced guardrail installer or inspector. Others that may benefit from the course include construction and maintenance engineers.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Frank Julian • 404 562-3689 • [frank.julian@fhwa.dot.gov](mailto:frank.julian@fhwa.dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380088

## COURSE TITLE

### Highway Safety Manual Practitioners Guide for Horizontal Curves

This course provides participants with some tools for evaluating the safety performance of horizontal curves along with suggestions for countermeasures that could improve safety performance. Topics covered in this course include the size and magnitude of the problem, tools for identifying and prioritizing horizontal curve safety, low cost maintenance countermeasures, and a discussion of engineering countermeasures.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Describe the magnitude of the safety issues and the trends in their State
- Describe two tools available for identifying problem locations with or without crash data
- Explain how maintenance activities can improve safety performance of horizontal curves
- Identify several engineering options available that can improve the safety performance of horizontal curves
- Identify operational and public policy issues that can improve the safety performance of horizontal curves

## TARGET AUDIENCE

The target audience for the course includes Federal, State and local highway engineers, consulting highway design engineers, and maintenance workers. This training program is intended for individuals that have the responsibility for identifying, recommending, selecting, installing and/or maintaining appropriate countermeasures to help improve the safety of horizontal curves.

**TRAINING LEVEL:** Intermediate

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Frank Julian • (404) 562-3689 • [frank.julian@dot.gov](mailto:frank.julian@dot.gov)

**Subject Matter Expert:** John McFadden • (410) 962-2482 • [john.mcfadden@dot.gov](mailto:john.mcfadden@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380089

**COURSE TITLE****Designing for Pedestrian Safety**

The Designing for Pedestrian Safety course is intended to help state and local transportation engineering professionals address pedestrian safety issues through design and engineering solutions. The training course includes a field exercise in the application of the principles, concepts, and strategies covered in the course. Also the participants will share and prioritize potential policies, programs, and strategies.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Describe the influence of planning factors: land use, street connectivity, access management, site design, and level of service.
- Describe how pedestrians should be considered and provided for during the planning, design, work zone, maintenance, and operations phases.
- Describe how human behavior affects the interaction between pedestrians and drivers
- Identify good practices and effective solutions to enhance pedestrian safety and accessibility.

**TARGET AUDIENCE**

This course is intended primarily for state DOT staff involved with the Highway Safety Improvement Program, and for FHWA Safety Specialists. These specialists shall include: Engineers, planners, traffic safety and enforcement professionals, public health and injury prevention professionals, and decision-makers who have the responsibility of improving pedestrian safety at the state or local level.

**TRAINING LEVEL:** Basic

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Peter Eun • 360 753-9551 • [peter.eun@dot.gov](mailto:peter.eun@dot.gov)

**Subject Matter Expert:** Rudolph M. Umbs • 7082833548 • [rudolph.umbs@dot.gov](mailto:rudolph.umbs@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)





## COURSE NUMBER

FHWA-NHI-380090

## COURSE TITLE

### Developing a Pedestrian Safety Action Plan

The Developing a Pedestrian Safety Action Plan course is designed to help state and local officials learn “HOW TO” address pedestrian safety issues in the development of a pedestrian safety action plan, program, and activities tailored to their community. It is also intended to assist agencies in the further enhancement of their existing pedestrian safety plan, programs, and activities, including involving partners and stakeholders, collecting and analyzing data and information, prioritizing issues and concerns, selecting and implementing an optimal combination of education, enforcement, engineering strategies. The training course includes a field exercise in the application of the principles, concepts, and strategies covered in the course. Also the participants will share and prioritize potential policies, programs, and strategies.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Develop and implement a Pedestrian Safety Action Plan addressing your specific issues, problems, needs and resources
- Describe how pedestrians should be considered and provided for during the planning, design, work zone, maintenance, and operations phases.
- Describe how human behavior affects the interaction between pedestrians and drivers
- Identify good practices and effective solutions to enhance pedestrian safety and accessibility.

## TARGET AUDIENCE

This course is intended primarily for state DOT staff involved with the Highway Safety Improvement Program, and for FHWA Safety Specialists. These specialists shall include: Engineers, planners, traffic safety and enforcement professionals, public health and injury prevention professionals, and decision-makers who have the responsibility of improving pedestrian safety at the state or local level.

**TRAINING LEVEL:** Basic

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Peter Eun • 360-753-9551 • [peter.eun@dot.gov](mailto:peter.eun@dot.gov)

**Subject Matter Expert:** Rudy Umbs • 708-283-3548 • [rudolph.umbs@dot.gov](mailto:rudolph.umbs@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380091

**COURSE TITLE****Planning and Designing for Pedestrian Safety**

The Planning and Designing for Pedestrian Safety is a combination of the information from the 2-day “Developing a Pedestrian Safety Action Plan” (NHI 380089) and 2-day “Designing for Pedestrian Safety” (NHI 380090) course. This comprehensive course is designed to help state and local officials learn “HOW TO” address pedestrian safety issues in the development of a pedestrian safety action plan, and specific programs and activities tailored to their community. It is also intended to assist agencies in the further enhancement of their existing pedestrian safety plan, programs, and activities, including involving partners and stakeholders, collecting and analyzing data and information, prioritizing issues and concerns, selecting and implementing an optimal combination of education, enforcement, engineering strategies. This course goes into more detail on engineering strategies than the “Developing a Pedestrian Safety Action Plan” (NHI 380089) course. This course includes two field exercises in the application of the principles, concepts, and strategies covered in the course. Also the participants will share and prioritize potential policies, programs, and strategies.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Describe the role that planning and street design play in pedestrian safety.
- Demonstrate how pedestrians should be considered and provided for during the planning, design, work zone maintenance, and operations phases of the pedestrian safety action plan.
- Describe how human behavior issues related to pedestrians and drivers interacting safely and common pedestrian crash types.
- Identify good practices and effective solutions to enhance pedestrian safety and accessibility.
- Explain the significance of land-use, street connectivity, and site design in helping to make a safer pedestrian environment.
- Recognize human behavior issues related to pedestrians and drivers interacting safely and common pedestrian crash types.
- Collect and analyze data in a meaningful way to identify safety deficiencies and priorities for improvement.
- Employ commonly used and effective pedestrian crash countermeasures
- Effectively involve stakeholders to create publicly supported and trusted policies, programs, and projects.

**TARGET AUDIENCE**

Engineers, planners, traffic safety and enforcement professionals, public health and injury prevention professionals, and decision-makers who have the responsibility of improving pedestrian safety at the state or local level.

**TRAINING LEVEL:** Basic

**FEE:** 2012: \$500 Per Person; 2013: N/A

**LENGTH:** 3 DAYS (CEU: 1.8 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Peter Eun • 360 753-9551 • [peter.eun@dot.gov](mailto:peter.eun@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



COURSE NUMBER

FHWA-NHI-380095

COURSE TITLE

## Geometric Design: Applying Flexibility and Risk Management

Highway designers often face complex trade-offs when developing projects. A “quality” design may be thought of as satisfying the needs of a wide variety of users while balancing the often competing interests of cost, safety, mobility, social and environmental impacts. Applying flexibility and risk management in highway design requires more than simply assembling geometric elements from the available tables, charts and equations of design criteria. This course provides participants with knowledge of the functional basis of critical design criteria to enable informed decisions when applying engineering judgment and flexibility. The course exercises and case studies provide practical applications of current knowledge from research and operational experience of human factors and safety effects for various design elements.

### OUTCOMES

Upon completion of the course, participants will be able to:

- Define the relationship among design criteria, design guidelines and design standards
- Describe the concepts of design speed, target speed, posted speed and operating speed
- Describe the FHWA Policy for Design Standards and Design Exceptions
- List the 13 controlling geometric design criteria that require a formal written design exception from FHWA
- Evaluate the safety effects and qualitative risk of proposed design exceptions
- Evaluate the effectiveness and appropriateness of mitigation strategies for design exceptions
- Describe the relationship between safety and key geometric features of highway alignment and cross section
- Describe the applicability of a human-centered approach to geometric design considerations

### TARGET AUDIENCE

This course is targeted toward engineers that are involved in applying engineering judgment in the selection of design criteria and in the assessment of design exceptions. It is most practical for practicing engineers and highway decision makers from state highway agencies, local agencies, design consultants, and FHWA field offices.

**TRAINING LEVEL:** Accomplished

**FEE:** 2012: \$400 Per Person; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Jeff Shaw • 708-283-3524 • [jeffrey.shaw@dot.gov](mailto:jeffrey.shaw@dot.gov)

**Subject Matter Expert:** Keith Harrison • 415-744-2657 • [keith.harrison@dot.gov](mailto:keith.harrison@dot.gov)

**Subject Matter Expert:** Mark Doctor • 404 562-3732 • [mark.doctor@dot.gov](mailto:mark.doctor@dot.gov)

**Subject Matter Expert:** Mark Taylor • 720-963-3235 • [mark.taylor@dot.gov](mailto:mark.taylor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



**COURSE NUMBER**

FHWA-NHI-380096

**COURSE TITLE****Modern Roundabouts: Intersections Designed for Safety**

The modern roundabout is a proven strategy for improving the safety and operations of intersections. The physical characteristics of a well-designed modern roundabout reduce the frequency and severity of intersection crashes for all users including pedestrians and bicyclists. This course highlights the benefits of modern roundabouts and gives participants the fundamental knowledge needed to plan and consider applying roundabout intersection projects in their area. This course is an introductory level course with a blend of technical and non-technical planning, design and operations considerations.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Distinguish a modern roundabout from other types of circular intersections
- Describe the safety advantages of roundabouts
- Describe the operational advantages roundabouts provide
- Identify what type of locations roundabouts may be appropriate
- Describe strategies to overcome common barriers to implementation of roundabouts, such as negative public perceptions
- Describe the key considerations when planning an area's first roundabout
- Apply basic traffic operational models and capacity calculations for roundabouts
- Describe key geometric design principles of a modern roundabout
- Apply signing and marking suggested practices
- Apply design strategies for pedestrians and bicyclists

**TARGET AUDIENCE**

Transportation professionals with at least one year of working experience

**TRAINING LEVEL:** Basic

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Hillary Isebrands • (720) 963-3222 • [hillary.isebrands@dot.gov](mailto:hillary.isebrands@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380097

## COURSE TITLE

### An Overview of the Railroad-Highway Grade Crossing Improvement Program

A highway-rail grade crossing is the intersection of two transportation modes: railroads and highways. Many crossings are “at-grade” which significantly increases incidents of often-fatal crashes between trains and motor vehicles. Over the past 30 years, there have been substantial reductions in crashes and fatalities at highway-rail grade crossings due to the efforts of federal, state, and local governments, the railroads, and non-profit organizations such as Operation Lifesaver, Inc. Nonetheless, crashes still occur.

The goal of this one-day training course is to provide attendees with the knowledge and tools needed to plan, implement, and evaluate safety improvements to highway-rail grade crossings. The course presents:

An overview of the regulations, responsibilities, and funding mechanisms that apply to today's Highway-Rail Grade Crossing (HRGX) program.

The steps involved in planning, implementing, and evaluating highway-rail grade crossing improvement projects.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Identify the highway-rail grade crossing program components and processes and the regulations that apply to the program.
- Identify highway-rail grade crossing improvement work that is required as part of highway improvement projects under other federal-aid programs.
- Describe the purpose and benefits of assessing highway-rail grade crossing safety and operations.
- Explain considerations for implementing and maintaining a grade crossing improvement project.
- Identify techniques and tools for improving highway-rail grade crossing safety and operations.

## TARGET AUDIENCE

The target audience for this training course includes: State DOT personnel involved in highway-rail grade crossings; Public project engineers from railroad industries; Transportation consultants; FHWA safety engineers; MPO/City/county DOT personnel; and FRA crossing managers.

## TRAINING LEVEL: Basic

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Guan Xu • (202) 366-5892 • [guan.xu@dot.gov](mailto:guan.xu@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

**COURSE NUMBER**

FHWA-NHI-380103

**COURSE TITLE****Highway Safety Improvement Program Manual**

The Highway Safety Improvement Program (HSIP) is a core Federal-aid highway program with the primary purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements. The HSIP is a roadway safety management process that consists of three main components: Planning, Implementation and Evaluation. While the HSIP is a Federal program, it is important to note the program components are applicable to road safety management processes at all levels of government. With a focus on results, the HSIP emphasizes a data-driven, strategic approach to improving highway safety.

This course introduces safety professionals to new procedures and technologies, and provide information on topics ranging from core safety concepts to detailed discussions of technical methods for data-driven safety planning which will result in successful HSIP efforts.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Recognize HSIP purpose, structure, and benefits
- Describe and use data-driven methods to identify sites for potential safety improvement
- Identify steps to conduct engineering studies and approaches to countermeasure identification
- Identify HSIP funding requirements
- Identify methods to measure overall HSIP program success and countermeasure effectiveness
- Describe the importance of using evaluation results in future efforts

**TARGET AUDIENCE**

The course is intended for both new and veteran state and local transportation professionals in the areas of data collection and analysis, safety management processes, and planning and project management.

**TRAINING LEVEL:** Basic

**FEE:** 2012: \$3000 Per Course; 2013: N/A

**LENGTH:** 2 DAYS (CEU: 1.2 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Karen Yunk • 609-637-4207 • [karen.yunk@dot.gov](mailto:karen.yunk@dot.gov)

**Subject Matter Expert:** Keith Sinclair • 410-962-3742 • [keith.sinclair@dot.gov](mailto:keith.sinclair@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)



## COURSE NUMBER

FHWA-NHI-380105

## COURSE TITLE

### Highway Safety Manual Practitioners Guide for Intersections

The new Highway Safety Manual is the state of the art “toolbox” for the “science of safety” for the analysis and prediction of crash frequency for highways and streets. The HSM reflects the evolution in safety analysis from descriptive methods to quantitative, predictive analyses.

The Highway Safety Manual (HSM) provides analytical tools and techniques for quantifying the potential effects on crashes as a result of decisions made in planning, design, operations, and maintenance. A universal objective is to reduce the number and severity of crashes within the limits of available resources, science, and technology, while meeting legislatively mandated priorities. The information in the HSM is provided to assist agencies in their effort to integrate safety into their decision-making processes. The HSM is intended to be a resource document that is used nationwide to help transportation professionals conduct safety analyses in a technically sound and consistent manner thereby improving decisions made based on safety performance.

This course introduces practitioners at the state, county, metropolitan planning organization (MPO), or local level to the new techniques and knowledge in the HSM. The users and professionals described above include, but are not limited to transportation planners, highway designers, traffic engineers, and other transportation professionals who make discretionary road planning, design and operational decisions.

## OUTCOMES

Upon completion of the course, participants will be able to:

- Recognize the Highway Safety Manual purpose, structure, and benefits
- Describe and apply Safety Performance Functions and Crash Modification Factors to analyze and predict crash frequency performance of highways, streets, and intersections

## TARGET AUDIENCE

The course is intended practitioners at the state, county, metropolitan planning organization (MPO), or local level.

## TRAINING LEVEL: Basic

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Timothy Taylor • 404-895-3910 • [timothy.taylor@dot.gov](mailto:timothy.taylor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)





**COURSE NUMBER**

FHWA-NHI-380109

**COURSE TITLE****Alternative Intersections and Interchanges**

Transportation professionals are continually challenged with finding improved ways for satisfying the mobility needs of an increasing population. Highway intersections pose particular challenges with regard to safety and mobility as traffic volumes and congestion levels continue to increase. As a result, drivers, pedestrians, and bicyclists experience longer delays and greater exposure to safety risks. Today's traffic and safety problems are becoming increasingly more complex, and conventional intersections and interchange designs are sometimes found to be insufficient to mitigate transportation problems. Consequently, many engineers are investigating and implementing innovative treatments in an attempt to alleviate these issues.

This course provides participants with an overview of various non-traditional intersection concepts that may offer advantages compared to conventional at-grade intersections and grade-separated interchanges. The training presents the salient geometric, operational, and safety features associated with the alternative design concepts, and will illustrate how intersections are selected using an analysis tool. It also will identify potential advantages and disadvantages of each design.

**OUTCOMES**

Upon completion of the course, participants will be able to:

- Describe key design and operation features of the six non-traditional intersections and interchanges: 1. Displaced Left-Turn Intersections; 2. Median U-turn Intersection; 3. Restricted Crossing U-Turn Intersection; 4. Quadrant Roadway Intersection; 5. Double Crossover Diamond Interchange (Diverging Diamond); 6. Displaced Left Turn Diamond Interchange
- List the advantages and disadvantages of their use
- Describe where they are best suited for existing and planned conditions
- Identify resources to acquire additional information on these designs and their implementations

**TARGET AUDIENCE**

Federal, State, and local transportation traffic and safety engineers, and planners involved in improving the performance of intersections.

**TRAINING LEVEL:** Intermediate

**FEE:** 2012: \$300 Per Person; 2013: N/A

**LENGTH:** 1 DAYS (CEU: .6 UNITS)

**CLASS SIZE:** MINIMUM: 20; MAXIMUM: 30

**NHI Training Information:** (703) 235-0534 • [nhitraining@dot.gov](mailto:nhitraining@dot.gov)

**Subject Matter Expert:** Joe Bared • 202-493-3314 • [joe.bared@dot.gov](mailto:joe.bared@dot.gov)

**Subject Matter Expert:** Mark Doctor • 404 562-3732 • [mark.doctor@dot.gov](mailto:mark.doctor@dot.gov)

**NHI Training Program Manager:** Tom Elliott • (703) 235-0544 • [thomas.elliott@fhwa.dot.gov](mailto:thomas.elliott@fhwa.dot.gov)

# NHI STORE PROVIDES RESOURCES AND REFERENCE MATERIALS

Created based on customer feedback, the NHI Store is an online resource that enables users to order course materials through the NHI Web site. These materials can be used to plan a workshop, support train-the-trainer programs, or gather highway-related reference materials. The NHI Store offers both electronic downloads and hard copy versions.

To search for and purchase NHI course training materials, please visit [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov). Easy directions are provided for ordering and payment; special instructions are provided for FHWA employees.

If you are unable to find the training materials you need, please contact us at [nhitraining@dot.gov](mailto:nhitraining@dot.gov).

**The following pages list all materials available for purchase at the time this catalog was published. For the most up-to-date listing, visit the NHI Store at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov). Credit card payment is accepted.**

## LEGEND

**PW - Participant Workbook**

**RM - Reference Manual**

**PP - PowerPoint Presentation**

**OM - Other Materials**

**EF - Electronic File**

Course Number	Material Name	Format	Type	Price
130053	Bridge Inspection Refresher Training (November 2011)	Hard Copy	PW	<b>\$70.00</b>
130053	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
130053	Bridge Inspector's Reference Manual-February 2012 (Compact Disc)	Hard Copy	RM	<b>\$20.00</b>
130053A	Bridge Inspection Refresher Training (November 2011)	Hard Copy	PW	<b>\$70.00</b>
130053A	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
130053A	Bridge Inspector's Reference Manual-February 2012 (Compact Disc)	Hard Copy	RM	<b>\$20.00</b>
130054	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
130054	Bridge Inspector's Reference Manual-February 2012 (Compact Disc)	Hard Copy	RM	<b>\$20.00</b>
130054	Engineering Concepts For Bridge Inspectors (September 2011)	Hard Copy	PW	<b>\$40.00</b>
130055	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
130055	Bridge Inspector's Reference Manual-February 2012 (Compact Disc)	Hard Copy	RM	<b>\$20.00</b>
130055	Safety Inspection of In-Service Bridges (Vol.1)-April 2012	Hard Copy	PW	<b>\$30.00</b>
130055	Safety Inspection of In-Service Bridges (Vol.2)-April 2012	Hard Copy	PW	<b>\$30.00</b>
130078	Fracture Critical Inspection Techniques for Steel Bridges (September 2011)	Hard Copy	PW	<b>\$50.00</b>
130081	(130081) Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures (April 2007)	Hard Copy	PW	<b>\$50.00</b>
130081	Handbook of Retrofit Options for Bridges Vulnerable to Coastal Storms (May 2008)	Hard Copy	OM	<b>\$40.00</b>

Course Number	Material Name	Format	Type	Price
<b>130081</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures-Examples (April 2007)	Hard Copy	OM	<b>\$40.00</b>
<b>130081</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures-SEC No. 1 (April 2007)	Hard Copy	RM	<b>\$100.00</b>
<b>130081A</b>	Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures-Examples (April 2007)	Hard Copy	OM	<b>\$40.00</b>
<b>130081A</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures-SEC No. 1 (April 2007)	Hard Copy	RM	<b>\$100.00</b>
<b>130081B</b>	Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures-Examples (April 2007)	Hard Copy	OM	<b>\$40.00</b>
<b>130081B</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures-SEC No. 1 (April 2007)	Hard Copy	RM	<b>\$100.00</b>
<b>130081C</b>	(130081C) Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures (April 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>130081C</b>	Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures-Examples (April 2007)	Hard Copy	OM	<b>\$40.00</b>
<b>130081C</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures-SEC No. 1 (April 2007)	Hard Copy	RM	<b>\$100.00</b>
<b>130081D</b>	(130081D) LRFD For Highway Bridge Superstructures 4.5 Day (April 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>130081D</b>	Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures (April 2007)	Hard Copy	RM	<b>\$100.00</b>
<b>130081D</b>	Load and Resistance Factor Design (LRFD) for Highway Bridge Superstructures-Examples (April 2007)	Hard Copy	OM	<b>\$40.00</b>
<b>130087</b>	Guidelines For The Installation, Inspection, Maintenance And Repair Of Structural Supports For Highw	Hard Copy	OM	<b>\$50.00</b>
<b>130087</b>	Inspection And Maintenance Of Ancillary Highway Structures-(March 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>130088</b>	Bridge Construction Inspection - Participant Workbook Volume 1 (Feburary 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>130088</b>	Bridge Construction Inspection - Participant Workbook Volume 2 (Feburary 2007)	Hard Copy	PW	<b>\$40.00</b>
<b>130091</b>	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
<b>130091</b>	Bridge Inspector's Reference Manual-February 2012 (Compact Disc)	Hard Copy	RM	<b>\$20.00</b>
<b>130091</b>	Underwater Bridge Inspection (January 2010)	Hard Copy	PW	<b>\$40.00</b>
<b>130091</b>	Underwater Inspection of Bridges (June 2010)	Hard Copy	RM	<b>\$40.00</b>
<b>130091A</b>	Bridge Inspector's Reference Manual (February 2012) - File Size: 136 MB	Electronic Copy	RM	<b>Free</b>
<b>130091A</b>	Bridge Inspector's Reference Manual-Compact Disc (December 2006)	Hard Copy	RM	<b>\$20.00</b>
<b>130091A</b>	Underwater Bridge Inspection (January 2010)	Hard Copy	PW	<b>\$40.00</b>
<b>130091A</b>	Underwater Inspection of Bridges (June 2010)	Hard Copy	RM	<b>\$40.00</b>
<b>130091B</b>	Underwater Bridge Repair (December 2009)	Hard Copy	RM	<b>\$40.00</b>

Course Number	Material Name	Format	Type	Price
<b>130091B</b>	Underwater Bridge Repair, Rehabilitation, and Countermeasures (December 2009)	Hard Copy	PW	<b>\$30.00</b>
<b>130092</b>	Fundamentals of LRFR and Applications of LRFR for Bridge Superstructures (May 2010)	Hard Copy	PW	<b>\$40.00</b>
<b>130092A</b>	Load and Resistance Factor Rating for Highway Bridges (May 2010)	Hard Copy	PW	<b>\$40.00</b>
<b>130092B</b>	Fundamentals of LRFR and Applications of LRFR for Bridge Superstructures (May 2010)	Hard Copy	PW	<b>\$40.00</b>
<b>130093</b>	LRFD Seismic Analysis and Design of Bridges (August 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>130093</b>	LRFD Seismic Analysis and Design of Bridges (February 2011)	Hard Copy	RM	<b>\$75.00</b>
<b>130093</b>	LRFD Seismic Analysis and Design of Bridges-Design Examples (September 2011)	Hard Copy	OM	<b>\$45.00</b>
<b>130095</b>	LRFD and Analysis of Curved Steel Highway Bridges (February 2011)	Hard Copy	PW	<b>\$70.00</b>
<b>130095</b>	LRFD and Analysis of Curved Steel Highway Bridges (February 2011)-Compact Disc	Hard Copy	RM	<b>\$20.00</b>
<b>130095A</b>	LRFD and Analysis of Curved Steel Highway Bridges (February 2011)-Compact Disc	Hard Copy	RM	<b>\$20.00</b>
<b>130095B</b>	LRFD and Analysis of Curved Steel Highway Bridges (February 2011)-Compact Disc	Hard Copy	RM	<b>\$20.00</b>
<b>130096</b>	Design Criteria for Arch and Cable Stayed Signature Bridges (November 2011)	Hard Copy	RM	<b>\$70.00</b>
<b>130096</b>	Design Criteria for Arch and Cable Stayed Signature Bridges (September 2011)	Hard Copy	PW	<b>\$40.00</b>
<b>131032</b>	Hot Mix Asphalt Construction - Participant Workbook (July 2002)	Hard Copy	PW	<b>\$50.00</b>
<b>131060</b>	Concrete Pavement Design Details And Construction Practices - Participant's Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>131060</b>	Concrete Pavement Design Details And Construction Practices - Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>131060</b>	Design Details For High-Performance Concrete Pavements: An Interactive CD-ROM	Hard Copy	OM	<b>\$20.00</b>
<b>131062</b>	PCC Pavement Evaluation And Rehabilitation - Participant Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>131062</b>	PCC Pavement Evaluation And Rehabilitation - Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>131063</b>	Hot Mix Asphalt Pavement Evaluation And Rehabilitation - Participant's Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>131063</b>	Hot Mix Asphalt Pavement Evaluation And Rehabilitation - Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>131064</b>	Introduction To Mechanistic-Empirical Pavement Design - Participant Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>131064</b>	Introduction To Mechanistic-Empirical Pavement Design - Participant Workbook	Electronic Copy	PW	<b>\$50.00</b>
<b>131064</b>	Introduction To Mechanistic-Empirical Pavement Design - Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>131064</b>	Introduction To Mechanistic-Empirical Pavement Design - Reference Manual	Electronic Copy	RM	<b>\$50.00</b>

Course Number	Material Name	Format	Type	Price
<b>131064</b>	Introduction To Mechanistic-Empirical Pavement Design - Workshop Problems	Hard Copy	OM	<b>\$50.00</b>
<b>131103A</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - PW	Hard Copy	PW	<b>\$40.00</b>
<b>131103A</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - RM	Hard Copy	RM	<b>\$40.00</b>
<b>131103A</b>	TCCC Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments	Electronic Copy	PW	<b>Free</b>
<b>131103B</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - PW	Hard Copy	PW	<b>\$40.00</b>
<b>131103B</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - RM	Hard Copy	RM	<b>\$40.00</b>
<b>131103C</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - PW	Hard Copy	PW	<b>\$40.00</b>
<b>131103C</b>	Pavement Preservation Design and Construction of Quality Preventive Maintenance Treatments - RM	Hard Copy	RM	<b>\$40.00</b>
<b>131106</b>	TRANSPORTATION ASSET MANAGEMENT (OCTOBER 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>131106A</b>	TRANSPORTATION ASSET MANAGEMENT (October 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>131107</b>	Principles And Practices For Enhanced Maintenance Systems	Electronic Copy	PW	<b>Free</b>
<b>131107</b>	Principles And Practices For Enhanced Maintenance Systems - Participant Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>131115</b>	PAVEMENT PRESERVATION: PREVENTIVE MAINTENANCE TREATMENT, TIMING, AND SELECTION (NOVEMBER 2007)	Electronic Copy	PW	<b>\$40.00</b>
<b>131116</b>	PAVEMENT MANAGEMENT SYSTEMS: CHARACTERISTICS OF AN EFFECTIVE	Electronic Copy	PW	<b>Free</b>
<b>131116</b>	PAVEMENT MANAGEMENT SYSTEMS: CHARACTERISTICS OF AN EFFECTIVE PROGRAM EXECUTIVE SUMMARY	Electronic Copy	EF	<b>Free</b>
<b>131116A</b>	PAVEMENT MANAGEMENT SYSTEMS: CHARACTERISTICS OF AN EFFECTIVE PROGRAM	Electronic Copy	PW	<b>\$20.00</b>
<b>132012</b>	Soils And Foundations Workshop - Reference Manual Volume 1 (December 2006)	Hard Copy	RM	<b>\$40.00</b>
<b>132012</b>	Soils And Foundations Workshop - Reference Manual Volume 2 (December 2006)	Hard Copy	RM	<b>\$40.00</b>
<b>132013</b>	Geosynthetics Engineering Workshop (RM)	Hard Copy	RM	<b>\$40.00</b>
<b>132013A</b>	Geosynthetic Design And Construction Guidelines (March 2009)	Hard Copy	PW	<b>\$50.00</b>
<b>132013A</b>	Geosynthetics Engineering Workshop	Hard Copy	RM	<b>\$40.00</b>
<b>132013B</b>	Geosynthetics Engineering Workshop	Hard Copy	RM	<b>\$40.00</b>
<b>132013C</b>	Geosynthetics Engineering Workshop	Hard Copy	RM	<b>\$40.00</b>
<b>132013D</b>	Geosynthetics Engineering Workshop	Hard Copy	RM	<b>\$40.00</b>
<b>132014</b>	Drilled Shafts: Construction Procedures and LRFD Design Methods (May 2010)	Hard Copy	RM	<b>\$50.00</b>

Course Number	Material Name	Format	Type	Price
132021	Design And Construction Of Driven Pile Foundations - Volume I - Resource Manual (April 2006)	Hard Copy	RM	\$50.00
132021	Design And Construction Of Driven Pile Foundations - Volume I - Resource Manual (April 2006)	Electronic Copy	RM	\$50.00
132021	Design And Construction Of Driven Pile Foundations - Volume II - Resource Manual (April 2006)	Hard Copy	RM	\$40.00
132021	Design And Construction Of Driven Pile Foundations - Volume II - Resource Manual (April 2006)	Electronic Copy	RM	\$40.00
132022	Design And Construction Of Driven Pile Foundations - Volume I - Resource Manual (April 2006)	Hard Copy	RM	\$50.00
132022	Design And Construction Of Driven Pile Foundations - Volume II - Resource Manual (April 2006)	Hard Copy	RM	\$40.00
132022	Driven Pile Foundations - Construction Monitoring	Hard Copy	PW	\$40.00
132031	Subsurface Investigations - Geotechnical Site Characterization - Reference Manual (May 2002)	Hard Copy	RM	\$50.00
132033	Soil Slope and Embankment Design (September 2005)	Hard Copy	RM	\$40.00
132034	Ground Improvements Reference Manual Volume I (August 2006)	Hard Copy	RM	\$50.00
132034	Ground Improvements Reference Manual Volume II (August 2006)	Hard Copy	RM	\$40.00
132035	Rock Slopes - Module 5 - Reference Manual	Hard Copy	RM	\$50.00
132035	Rock Slopes - Module 5 - Student Exercises (August 1999)	Hard Copy	OM	\$50.00
132036	Earth Retaining Structures (RM)	Hard Copy	RM	\$50.00
132037	Shallow Foundations	Hard Copy	RM	\$50.00
132040	Geotechnical Aspects of Pavements (August 2010)	Hard Copy	RM	\$40.00
132041	Geotechnical Instrumentation - Module 11 - Reference Manual	Hard Copy	RM	\$50.00
132042	Corrosion/Degradation of Soil Reinforcements for MSE/RSS (November 2009)	Hard Copy	RM	\$40.00
132042	Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes-Vol 1 (March 2010)	Hard Copy	RM	\$40.00
132042	Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes-Vol 2 (March 2010)	Hard Copy	RM	\$40.00
132043	Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes-Vol 1 (March 2010)	Hard Copy	RM	\$40.00
132043	Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes-Vol 2 (March 2010)	Hard Copy	RM	\$40.00
132069	Driven Pile Foundation Inspection - Participant Workbook (July 2006)	Hard Copy	PW	\$50.00
132069	Plan Set Handout Driven Pile Foundation Inspection Course (October 2002)	Hard Copy	OM	\$60.00
132070	Drilled Shaft Foundation Inspection - Participant Workbook (December 2002)	Hard Copy	PW	\$50.00
132070	Drilled Shaft Inspector's Course - Plan Set Handout	Hard Copy	OM	\$50.00
132078	Micropile Design and Construction Reference Manual (December 2005)	Hard Copy	RM	\$30.00



Course Number	Material Name	Format	Type	Price
<b>132081</b>	Highway Slope Maintenance and Slide Restoration -- Participant Workbook	Hard Copy	PW	<b>\$50.00</b>
<b>132081</b>	Highway Slope Maintenance and Slide Restoration -- Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>132082</b>	LFRD for Highway Bridge Substructures and Earth Retaining Structures (Jan 2007)	Hard Copy	RM	<b>\$50.00</b>
<b>132082</b>	LFRD for Highway Bridge Substructures and Earth Retaining Structures (Jan 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>132082</b>	LFRD for Highway Bridge Substructures and Earth Retaining Structures (Jan 2007)	Electronic Copy	RM	<b>Free</b>
<b>132083</b>	Implementation of LRFD Geotechnical Design for Bridge Foundations (February 2011)	Hard Copy	RM	<b>\$20.00</b>
<b>132094</b>	LRFD Seismic Analysis and Design of Transportation Structures, Features and Foundations(August 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>132094</b>	LRFD Seismic Analysis and Design of Transportation Structures, Features and Foundations(August 2011)	Hard Copy	RM	<b>\$75.00</b>
<b>133028</b>	Traffic Signal Design and Operation - Workshop Solutions (Dec 2011)	Hard Copy	OM	<b>\$50.00</b>
<b>133028</b>	Traffic Signal Design and Operation - Participant Workbook (Dec 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>133028</b>	Traffic Signal Design and Operation - Reference Manual (Dec 2011)	Hard Copy	RM	<b>\$50.00</b>
<b>133072</b>	High Occupancy Vehicle Facilities	Hard Copy	PW	<b>\$50.00</b>
<b>133072A</b>	HOV Facilities Training Course	Hard Copy	PW	<b>\$50.00</b>
<b>133075</b>	Freeway Management And Operations - Participant Workbook (August 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>133075A</b>	Freeway Management And Operations - Participant Workbook (August 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>133078</b>	Access Management Location and Design (February 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>133099</b>	Managing Travel For Planned Events - CD (September 2005)	Hard Copy	OM	<b>\$20.00</b>
<b>133099</b>	Managing Travel For Planned Events - Participant Workbook (September 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>133099A</b>	Managing Travel for Planned Special Events	Hard Copy	PW	<b>\$50.00</b>
<b>134001</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	PW	<b>\$40.00</b>
<b>134001</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	RM	<b>\$40.00</b>
<b>134001A</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	PW	<b>\$40.00</b>
<b>134001A</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	RM	<b>\$40.00</b>
<b>134001B</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	PW	<b>\$40.00</b>
<b>134001B</b>	PRINCIPLES OF WRITING HIGHWAY CONSTRUCTION SPECIFICATIONS (MARCH 2003)	Hard Copy	RM	<b>\$40.00</b>
<b>134005</b>	VALUE ENGINEERING (AUGUST 2010)	Hard Copy	PW	<b>\$30.00</b>
<b>134005A</b>	VALUE ENGINEERING (AUGUST 2010)	Hard Copy	PW	<b>\$30.00</b>



Course Number	Material Name	Format	Type	Price
<b>134005B</b>	VALUE ENGINEERING (AUGUST 2010)	Hard Copy	PW	<b>\$30.00</b>
<b>134005C</b>	VALUE ENGINEERING (AUGUST 2010)	Hard Copy	PW	<b>\$30.00</b>
<b>134029</b>	Bridge Maintenance Training - Participant's Manual (January 2003)	Hard Copy	PW	<b>\$50.00</b>
<b>134029</b>	Bridge Maintenance Training - Participant's Manual (January 2003)	Electronic Copy	PW	<b>Free</b>
<b>134029</b>	Bridge Maintenance Training - Reference Manual (March 2003)	Hard Copy	RM	<b>\$50.00</b>
<b>134029</b>	Bridge Maintenance Training - Reference Manual (March 2003)	Electronic Copy	RM	<b>Free</b>
<b>134037A</b>	Managing Highway Contract Claims: Analysis And Avoidance - Participant Notes (September 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>134042</b>	MATERIALS CONTROL AND ACCEPTANCE QUALITY ASSURANCE (AUGUST 2009)	Electronic Copy	PW	<b>\$60.00</b>
<b>134042</b>	MATERIALS CONTROL AND ACCEPTANCE QUALITY ASSURANCE (AUGUST 2009)	Hard Copy	PW	<b>\$60.00</b>
<b>134049</b>	Use Of CPM For Estimating, Scheduling And Timely Completion - Participant Manual	Hard Copy	PW	<b>\$50.00</b>
<b>134055</b>	Construction Inspection, Workmanship, and Quality (April 2007)	Hard Copy	PW	<b>\$40.00</b>
<b>134055</b>	Construction Inspection, Workmanship, and Quality (April 2007)	Electronic Copy	PW	<b>\$40.00</b>
<b>134055</b>	Construction Inspection, Workmanship, and Quality (September 2006)	Hard Copy	RM	<b>\$40.00</b>
<b>134055</b>	Construction Inspection, Workmanship, and Quality (September 2006)	Electronic Copy	RM	<b>\$40.00</b>
<b>134058</b>	Alternative Contracting - Participant Workbook / Reference Manual (September 2004)	Hard Copy	PW	<b>\$50.00</b>
<b>134060</b>	Partnering: A Key Tool for Improving Project Delivery in the Field (PW) Spring 2007	Electronic Copy	PW	<b>\$30.00</b>
<b>134062A</b>	Participant Workbook Volume 1	Hard Copy	PW	<b>\$40.00</b>
<b>134062A</b>	Participant Workbook Volume II	Hard Copy	PW	<b>\$40.00</b>
<b>134064</b>	Transportation Construction Quality Assurance (June 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>134064</b>	Transportation Construction Quality Assurance Reference Manual	Hard Copy	RM	<b>\$50.00</b>
<b>134064</b>	Transportation Construction Quality Assurance Reference Manual	Electronic Copy	RM	<b>Free</b>
<b>134064A</b>	Transportation Construction Quality Assurance	Electronic Copy	RM	<b>Free</b>
<b>134065</b>	RISK MANAGEMENT (NOVEMBER 2006)	Hard Copy	PW	<b>\$30.00</b>
<b>134065</b>	RISK MANAGEMENT (NOVEMBER 2006)	Electronic Copy	PW	<b>\$30.00</b>
<b>134065A</b>	Risk Management Participant Workbook (November 2006)	Hard Copy	PW	<b>\$30.00</b>
<b>134065A</b>	Risk Management Participant Workbook (November 2006)	Electronic Copy	PW	<b>\$30.00</b>
<b>134068</b>	ADDRESSING UNCERTAINTY IN COST	Electronic Copy	PW	<b>\$30.00</b>

Course Number	Material Name	Format	Type	Price
135010	River Engineering For Highway Encroachments: Highways In The River Environment - Participant's Workb	Hard Copy	PW	\$50.00
135010	River Engineering For Highway Encroachments: Highways In The River Environment (December 2001)	Hard Copy	OM	\$50.00
135027	Urban Drainage Design Manual, HEC-22 (September 2009)	Hard Copy	RM	\$50.00
135028	Highway Stormwater Pump Station Design - Participant's Guide	Hard Copy	PW	\$50.00
135028	Highway Stormwater Pump Station Design HEC-24	Hard Copy	OM	\$50.00
135041A	HEC-RAS, RIVER ANALYSIS SYSTEM-(JUNE 2008)	Hard Copy	PW	\$40.00
135046	Evaluating Scour At Bridges, 5th Edition (HEC-18)	Hard Copy	OM	\$50.00
135046	Stream Instability, Bridge Scour, and Countermeasures: A Field Guide for Bridge Inspectors (Feb2009)	Hard Copy	RM	\$10.00
135046	Stream Stability and Scour at Highway Bridges	Hard Copy	PW	\$50.00
135046	Stream Stability at Highway Structures, 4th Edition (HEC-20)	Hard Copy	OM	\$50.00
135047	Stream Instability, Bridge Scour, and Countermeasures: A Field Guide for Bridge Inspectors (Feb2009)	Hard Copy	RM	\$10.00
135047	Stream Stability and Scour at Highway Bridges for Bridge Inspectors (June 2009)	Hard Copy	PW	\$50.00
135048	Countermeasure Design for Bridge Scour and Stream Instability	Hard Copy	PW	\$30.00
135048	Countermeasure Design for Bridge Scour and Stream Instability	Hard Copy	OM	\$30.00
135048	HEC-23 Bridge Scour And Stream Instability Countermeasures-Vol I	Hard Copy	RM	\$20.00
135048	HEC-23 Bridge Scour And Stream Instability Countermeasures-Vol II	Hard Copy	RM	\$30.00
135048	Stream Instability, Bridge Scour, and Countermeasures: A Field Guide for Bridge Inspectors (Feb2009)	Hard Copy	RM	\$10.00
135056	Culvert Design for Aquatic Organism Passage: HEC-26, First Ed. (October 2010)	Hard Copy	OM	\$50.00
135056	Hydraulic Design of Highway Culverts-HDS 5	Hard Copy	OM	\$50.00
135065	Introduction to Highway Hydraulics-(June 2008)	Hard Copy	PW	\$50.00
135065	Introduction to Highway Hydraulics-(June 2008)	Hard Copy	OM	\$50.00
135065	Introduction to Highway Hydraulics-HDS No. 4 (June 2008)	Hard Copy	OM	\$50.00
135067	Highway Hydrology, Hydraulic Design Series No. 2, Second Edition - (October 2002)	Hard Copy	OM	\$50.00
135067	Practical Highway Hydrology - Participant Workbook (January 2007)	Hard Copy	PW	\$30.00
135067	Practical Highway Hydrology - Participant Workbook (January 2007)	Electronic Copy	PW	\$30.00
135081	Introduction To Highway Hydraulics Software (March 2011)	Hard Copy	PW	\$50.00
135082	Highways in the Coastal Environment - Participant Workbook (April 2008)	Hard Copy	PW	\$40.00
135082	Highways in the Coastal Environment (HEC-25)	Hard Copy	RM	\$40.00
135085	PLAN OF ACTION (POA) FOR SCOUR CRITICAL BRIDGES - CD (MAY 2007)	Hard Copy	PP	Free
137030	Principles and Tools for Road Weather Management	Hard Copy	RM	\$50.00

Course Number	Material Name	Format	Type	Price
<b>137030</b>	Principles And Tools For Road Weather Management - Case Study Handout (November 2005)	Hard Copy	OM	<b>\$40.00</b>
<b>137030</b>	Principles And Tools For Road Weather Management - Participant Workbook (November 2005)	Hard Copy	PW	<b>\$50.00</b>
<b>137033</b>	ITS/CVO Security Awareness	Hard Copy	PW	<b>\$50.00</b>
<b>137033</b>	Quick Reference Guide	Hard Copy	OM	<b>Free</b>
<b>137041</b>	Using ITS Deployment analysis System (IDAS)	Hard Copy	PW	<b>\$50.00</b>
<b>137044</b>	Improving Highway Safety with ITS	Hard Copy	PW	<b>\$50.00</b>
<b>137044</b>	Improving Highway Safety with ITS - RM	Hard Copy	RM	<b>\$30.00</b>
<b>137046</b>	NHI Using IDAS Data	Electronic Copy	EF	<b>Free</b>
<b>139003</b>	Advanced Freight Planning	Hard Copy	PW	<b>\$50.00</b>
<b>139004</b>	Principles of Effective Commerical Motor Vehicle (CMV) Size and Weight Enforcement (Nov 2010)	Hard Copy	PW	<b>\$50.00</b>
<b>139005</b>	Linking Freight to Planning and the Environment (PW)	Hard Copy	PW	<b>\$50.00</b>
<b>141029</b>	Basic Relocation under the Uniform Act, Participant Workbook (December 2008)	Hard Copy	PW	<b>\$40.00</b>
<b>141030</b>	Advanced Relocation (June 2006)	Hard Copy	PW	<b>\$40.00</b>
<b>141031</b>	Business Relocation, Participant Workbook (January 2007)	Hard Copy	PW	<b>\$30.00</b>
<b>141031</b>	Business Relocation, Participant Workbook (January 2007)	Electronic Copy	PW	<b>\$30.00</b>
<b>141043</b>	Appraisal for Federal-Aid Highway Programs (May 2012)	Hard Copy	PW	<b>\$40.00</b>
<b>141044</b>	Appraisal Review for Federal-Aid Highway Programs (August 2011)	Hard Copy	PW	<b>\$40.00</b>
<b>141050</b>	Introduction to Federal-Aid Right-of-Way Requirements for Local Public Agencies (August 2010)	Hard Copy	PW	<b>\$50.00</b>
<b>142005</b>	NEPA And The Transportation Decision Making Process (July 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>142042</b>	Fundamentals Of Title VI / Environmental Justice PW (February 2007)	Hard Copy	PW	<b>\$50.00</b>
<b>142045</b>	Pedestrian Facility Design (May 2009)	Hard Copy	PW	<b>\$50.00</b>
<b>142046</b>	Bicycle Facility Design (May 2009)	Hard Copy	PW	<b>\$50.00</b>
<b>142047</b>	Water Quality Management of Highway Runoff PW/RM	Hard Copy	PW	<b>\$50.00</b>
<b>142049</b>	Beyond Compliance: Historic Preservation In Transporation Project Development - Exercise 4 (July 07)	Hard Copy	OM	<b>\$20.00</b>
<b>142049</b>	Beyond Compliance: Historic Preservation In Transporation Project Development (January 2012)	Hard Copy	PW	<b>\$50.00</b>
<b>142049</b>	Beyond Compliance: Historic Preservation In Transportation Project Development - Exercise 3(July 07)	Hard Copy	OM	<b>\$20.00</b>
<b>142049</b>	Beyond Compliance: Historic Preservation In Transportation Project Development -Exercise 2 (July 07)	Hard Copy	OM	<b>\$20.00</b>
<b>142050</b>	Context Sensitive Solutions Participant Workbook (February 2011)	Hard Copy	PW	<b>\$60.00</b>
<b>142051</b>	Highway Traffic Noise-Participant Workbook (July 2008)	Hard Copy	PW	<b>\$50.00</b>

Course Number	Material Name	Format	Type	Price
<b>142054</b>	Design And Implementation Of Erosion And Sediment Control - Participant Workbook (December 2006)	Hard Copy	PW	<b>\$30.00</b>
<b>142054</b>	Design And Implementation Of Erosion And Sediment Control - Reference Manual (December 2006)	Hard Copy	RM	<b>\$30.00</b>
<b>142055</b>	Advanced Seminar on Transportation Project Development: Navigating the NEPA Maze (December 2008)	Hard Copy	PW	<b>\$40.00</b>
<b>151018</b>	Application of FHWA Traffic Monitoring Guide, Handouts Part 2 (November 2006)	Hard Copy	OM	<b>\$10.00</b>
<b>151018</b>	Application Of The FHWA Traffic Monitoring Guide - Handouts (March 2004)	Hard Copy	OM	<b>\$50.00</b>
<b>151018</b>	Application Of The FHWA Traffic Monitoring Guide - Participant Workbook (November 2006)	Hard Copy	PW	<b>\$50.00</b>
<b>151018</b>	Traffic Monitoring Guide (March 2004)	Hard Copy	OM	<b>\$50.00</b>
<b>151021</b>	Administration Of FHWA Planning & Research Grants (June 2006)	Hard Copy	PW	<b>\$30.00</b>
<b>151021</b>	Administration Of FHWA Planning & Research Grants (June 2006)	Hard Copy	RM	<b>\$50.00</b>
<b>151038</b>	Introduction To Statewide Transportation Planning (February 2008)	Hard Copy	PW	<b>\$50.00</b>
<b>151039</b>	Applying Gis Spatial Data Technologies To Transportation - PW/RM CD (December 2003)	Hard Copy	OM	<b>\$20.00</b>
<b>151039</b>	Applying Spatial Data Technologies To Transportation (December 2003)	Hard Copy	PW	<b>\$50.00</b>
<b>151043</b>	Transportation and Land Use (March 2008)	Hard Copy	PW	<b>\$50.00</b>
<b>152054</b>	INTRODUCTION TO URBAN TRAVEL DEMAND FORECASTING (February 2012)	Hard Copy	PW	<b>\$50.00</b>
<b>152054</b>	Introduction to Urban Travel Demand Forecasting-Course Prerequisite (Compact Disc)	Hard Copy	OM	<b>Free</b>
<b>380005</b>	Railroad-Highway Grade Crossing Improvement Program - Participant Workbook (July 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>380034</b>	Design Construction And Maintenance Of Highway Safety Features And Appurtenances - Participant Workb	Hard Copy	PW	<b>\$60.00</b>
<b>380034A</b>	Design Construction And Maintenance Of Highway Safety Features And Appurtenances - Participant Workb	Hard Copy	PW	<b>\$60.00</b>
<b>380034B</b>	Design Construction And Maintenance Of Highway Safety Features And Appurtenances - Participant Workb	Hard Copy	PW	<b>\$60.00</b>
<b>380069</b>	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380069</b>	FHWA Road Safety Audit Guidelines (June 2006)	Electronic Copy	OM	<b>Free</b>
<b>380069</b>	Road Safety Audits/Assesments Participant Workbook (August 2008)	Hard Copy	PW	<b>\$50.00</b>
<b>380069</b>	Road Safety Audits: Case Studies (December 2006)	Electronic Copy	OM	<b>Free</b>
<b>380069</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380069</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Pedestrian Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>

Course Number	Material Name	Format	Type	Price
<b>380069</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	<b>Free</b>
<b>380069</b>	Traffic Signals (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380070</b>	HSM Practitioner's Guide for Geometric Design Features Participant Workbook (May 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>380071</b>	Interactive Highway Safety Design Model - Participant Workbook (November 2008)	Hard Copy	PW	<b>\$50.00</b>
<b>380073</b>	Fundamentals of Planning, Design and Approval of Interchange Improvements...(February 2010)	Hard Copy	PW	<b>\$50.00</b>
<b>380074</b>	Designing And Operating Intersections For Safety - Participant Workbook (September 2010)	Hard Copy	PW	<b>\$50.00</b>
<b>380074</b>	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380074</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380074</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380074</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	<b>Free</b>
<b>380074</b>	Traffic Signals (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380075</b>	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380075</b>	New Approaches To Highway Safety Analysis - Reference Manual (February 2006)	Hard Copy	RM	<b>\$50.00</b>
<b>380075</b>	New Approaches to Highway Safety Analysis Participant Workbook (April 2011)	Hard Copy	PW	<b>\$50.00</b>
<b>380075</b>	Toolbox of Countermeasures & Their Potential Effectives for Intersection Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380075</b>	Toolbox of Countermeasures & Their Potential Effectives for Pedestrian Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380075</b>	Toolbox of Countermeasures & Their Potential Effectives for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	<b>Free</b>
<b>380075</b>	Traffic Signals (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380076</b>	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380076</b>	Low Cost Safety Improvements Workshop - Participant Workbook (February 2010)	Hard Copy	PW	<b>\$50.00</b>
<b>380076</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>
<b>380076</b>	Toolbox of Countermeasures & Their Potential Effectiveness for Pedestrian Crashes (September 2007)	Electronic Copy	OM	<b>Free</b>

Course Number	Material Name	Format	Type	Price
380076	Toolbox of Countermeasures & Their Potential Effectiveness for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	Free
380076	Traffic Signals (September 2007)	Electronic Copy	OM	Free
380077	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	Free
380077	Intersection Safety Workshop - Participant Workbook (April 2012)	Hard Copy	PW	\$50.00
380077	Intersection Safety Workshop - Participant Workbook (May 2011)	Hard Copy	PW	\$50.00
380077	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	Free
380077	Toolbox of Countermeasures & Their Potential Effectiveness for Pedestrian Crashes (September 2007)	Electronic Copy	OM	Free
380077	Toolbox of Countermeasures & Their Potential Effectiveness for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	Free
380077	Traffic Signals (September 2007)	Electronic Copy	OM	Free
380078	Desktop Reference for Crash Reduction Factors (September 2007)	Electronic Copy	OM	Free
380078	Signalized Intersections: A Guidebook Workshop - Participant Workbook (April 2009)	Hard Copy	PW	\$50.00
380078	Toolbox of Countermeasures & Their Potential Effectiveness for Intersection Crashes (September 2007)	Electronic Copy	OM	Free
380078	Toolbox of Countermeasures & Their Potential Effectiveness for Pedestrian Crashes (September 2007)	Electronic Copy	OM	Free
380078	Toolbox of Countermeasures & Their Potential Effectiveness for Roadway Departure Crashes (Sept 2007)	Electronic Copy	OM	Free
380078	Traffic Signals (September 2007)	Electronic Copy	OM	Free
380089	Designing for Pedestrian Safety - Participant Workbook (April 2012)	Hard Copy	PW	\$50.00
380090	Developing a Pedestrian Safety Action Plan Participant Workbook (January 2009)	Hard Copy	PW	\$50.00
380095	Highway Design: Applying Flexibility & Risk Management (Participant Workbook Guide April 2011)	Hard Copy	PW	\$50.00
380095	Highway Design: Applying Flexibility & Risk Management (Participant Workbook Guide August 2011)	Hard Copy	PW	\$50.00
380095	Highway Design: Applying Flexibility & Risk Management (Participant Workbook Guide June 2010)	Hard Copy	PW	\$50.00
380100	Interactive Highway Safety Design Model - Web-based course-Participant Workbook	Electronic Copy	PW	\$50.00
420018	Instructor Development Course 3.5 Day - Participant Workbook and Reference Manual (May 2006)	Hard Copy	PW	\$40.00
420018A	Instructor Development Course 4.5 Day - Participant Workbook & Reference Manual (June 2006)	Hard Copy	PW	\$40.00
420050	How to Create and Deliver a Dynamic Presentation (April 2010)	Hard Copy	PW	\$30.00



# NATIONAL HIGHWAY INSTITUTE (NHI)

Division of FHWA Office of Technical Services

1310 N Courthouse Road, Suite 300

Arlington, VA 22201

Phone: 703-235-0500 or Toll Free 877-558-6873

Fax: 703-235-0593

## MAIN CONTACTS

### Questions About?

NHI Training

NHI Web site

Instructors

Materials

### E-mail

nhitraining@dot.gov

nhiwebmaster@dot.gov

nhiinstructorliaison@dot.gov

nhimaterials@dot.gov

### Telephone

703-235-0534

703-235-0556

703-235-0952

703-235-0552

## SUBJECT AREA CONTACTS

### Questions About?

Asset Management

Business, Public Administration & Quality

Communications

Construction and Maintenance

Design and Traffic Operations

Environment

Freight and Transportation Logistics

Geotechnical

Highway Safety

Hydraulics

Intelligent Transport Systems (ITS)

Pavement and Materials

Real Estate

Structures

Transportation Planning

### Contact

Marty Ross

Tom Elliott

Bud Cribbs

Marty Ross

Bud Cribbs

Mila Plosky

Bud Cribbs

Louisa Ward

Tom Elliott

Louisa Ward

Bud Cribbs

Marty Ross

Mila Plosky

Louisa Ward

Mila Plosky

### Name

Barnaby, Rick

Cribbs, Bud

Elliott, Tom

Plosky, Mila

Ross, Marty

Shelsta, Heather

Ward, Louisa

### Title

Training Director

Training Program Manager

Training Program Manager

Training Program Manager

Training Program Manager

Training Program/Marketing Manager

Training Program Manager

### Email

rick.barnaby@dot.gov

bud.cribbs@dot.gov

thomas.elliott@dot.gov

mila.plosky@dot.gov

marty.ross@dot.gov

heather.shelsta@dot.gov

louisa.ward@dot.gov



NATIONAL HIGHWAY INSTITUTE  
1310 N. Courthouse Road, Suite 300  
Arlington, VA 22201

(703) 235-0500  
(877) 558-6873  
Fax (703) 235-0593

[www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov)